IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Applicant:	Carter et al.	Atty Docket:	16279-14C
Serial No:	Unassigned	Art Unit:	Unassigned
Filing Date:		Examiner:	Unassigned

Title: **"DEVICE AND METHOD FOR TRENCHLESS REPLACEMENT OF UNDERGROUND PIPE"**

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

This Preliminary Amendment is submitted with a Continuation Application of allowed copending patent application Serial No. 09/350,948. Please make the amendments shown in the attached papers in this application in the specification, claims and drawings prior to calculating the filing fee. The amendments to the specification and drawings are identical to those made in the copending allowed parent patent application, and are made to correct inadvertent typographical errors and the like, such that the specification and the drawings will fully correspond to each other.

In the Abstract

Please substitute the Replacement Abstract submitted herewith on a separate page.

In the Specification

Please amend the Specification as indicated; a clean copy of the amended paragraphs follows and a marked up copy is attached as Attachment A.

Page 1, line 5, please insert after "is" --a continuation application of copending U.S. Patent application Serial No. 09/350,948, filed July 9, 1999, which is--.

Page 13, line 2, please delete "Fig. 8" and insert therefor --Fig. 9--.

Page 13, line 2, please delete "Fig. 9" and insert therefor --Fig. 10--.

Page 21, line 15, please delete "916" and insert therefor --914--.

Page 22, line 13, please delete "716" and insert therefore --916--.

Page 23, line 7, please delete "1001" and insert therefor --1004--.

Page 23, line 21, please delete "1042" and insert therefor --1034--.

Page 25, line 22, please delete "Fig. 5" and insert therefor --Fig. 25--.

Page 25, line 23, please delete "Fig. 6" and insert therefor --Fig. 26--.

Page 27, lines 14-15, please delete "Fig. 25" and insert therefor --Fig. 28--.

Page 28, line 14, please delete "560 and".

Clean Copy of Specification Paragraphs

Page 1, Lines 5-9

The present invention is a continuation application of copending U.S. Patent application Serial No. 09/350,948, filed July 9, 1999, which is a continuation-in-part application, based upon and claiming priority to pending International Patent Application Serial No. PCT/US98/00266, filed January 9, 1998 by the inventors hereof; which application claims priority to U.S. Provisional Patent Application Serial No. 60,035,174, filed January 9, 1997 by the inventors hereto to which priority is claimed.

Page 13, Lines 1-17

A cable pulling device that is suitable for use in the present invention is depicted in a side elevational view in Fig. 9 and a cable engaging collet of the cable puller is depicted in Fig. 10. The cable puller 120 is preferably formed with two parallelly disposed hydraulic pistons 510 having outer piston housings 512 that are mounted at their rearward ends 514 to a rear end fixture 516. A forward end fixture 528 is engaged to the forward ends of the outer housings 512. The hydraulic lines 132 are engaged to the end fixtures 516 and 528 through a suitable coupling 518 such that hydraulic fluid passes through the hydraulic lines 132, through the end fixtures 516 and 528 and into the two hydraulic pistons 510. Hydraulic push rods 524 project outwardly from the forward end fixture 528 and are fixedly engaged to a front end block 536. A slotted, generally cylindrical nose piece 540 is engaged to the front end block 536. The nose piece 540 is formed with a cable passage slot 544 cut through a side of the nose piece 540, and the outer diameter of the nose piece 540 is sized to mount within the shoulder 434 of the slotted annulus 124 of the frame member 84, as is described hereinbelow with the aid of Fig. 11. A generally U-

shaped cable passage slot, generally denoted by the numeral 550 is formed in each of the front end block 536, forward end fixture 528 and the rear end fixture 514, such that the cable 70 can be installed within the cable pulling device 120 from its side. That is, it is not necessary to thread an end of the cable 70 through the cable pulling device 120.

Page 21, Lines 8-23

A further mole design 900 is depicted in Figs. 19, 20 and 21, wherein Fig. 19 is a side elevational view of the mole 900 depicted in a pipe bursting operation; Fig. 20 is a front elevational view of the mole 900 and Fig. 21 is a side elevational view of the mole 900 depicted in a further stage of a pipe bursting operation. As depicted in Fig. 19, the mole 900 is being pulled through a pipe 904 composed of fracturable material, such as cast iron or ceramic pipe. A pulling cable 70 is engaged to the mole 900 as has generally been described hereinabove. The mole 900 includes a tapered body portion 908 having a front end 912 whose diameter is less than the diameter of the pipe 904 and a rearward end 914 whose diameter is greater than the diameter of the pipe 904. The tapered body 908 of the mole engages the pipe at a pipe engagement region 916 generally existing between the dotted pipe engagement lines 920, such that a forward, intact section of pipe 924 exists in front of the engagement lines 920 and fractured pipe segments 928 exist behind the pipe engagement lines 920. It is therefore to be understood that a generalized outward force that is uniformly, circumferentially applied to the pipe 904 in the engagement region 916 causes the pipe material to fracture due to the large pulling force applied to the mole 900 through the cable 70. Therefore, in the mole embodiment 900 a smooth tapered surface mole is utilized to burst the fracturable pipe 904.

Page 22, Line 11 - Page 23, Line 3

A single blade 980 may be engaged within a blade holding slot 984 to project from the side of the tapered body portion 908. Significantly, the frontward edge 988 of the blade 980 is disposed rearwardly of the pipe fracturing region 916, such that the blade 980 is not utilized in the pipe fracturing activity of the mole 900. The blade 980 is utilized where the mole 900 encounters pipe engagement fixtures such as the pipe flanges 990 which include a flexible seal 994. Specifically, as depicted in Fig. 21 and in comparison to Fig. 19, the mole 900 has been pulled (leftward) through the pipe 904 past the flange members 990, such that the pipe around

the flange members has been fractured. Nevertheless, the flexible seal member 994 has remained intact. In testing with smooth tapered surface moles, the inventors have found that such moles work very well in fracturing pipe, however seals such as 994 sometimes create significant drag. Blade 980 thus augments the mole 900 by providing a sharp edge which will cut through the seal 994, whereby it will pass around the mole and not create a drag problem. It is therefore the case that a smooth tapered mole, without any fins is quite adequate to fracture and replace fracturable pipe such as cast iron and ceramic. Where certain types of pipe joinder fixtures are encountered, a blade 980 may be required to efficiently remove portions of the pipe engagement fixture from around the mole.

Page 23, Lines 4-13

Still further alternative mole designs are depicted in Figs. 22 and 23, wherein Fig. 22 is a side elevational view depicting an alternative fin design with a mole, and Fig. 23 is a side elevational view of the fin depicted in Fig. 22. As depicted in Fig. 22, a mole 1000 is formed with a tapered body portion 1004 having a front end 1008 whose diameter is less than the diameter of a pipe (not shown) through which the mole will be pulled, and a rearward end 1012 having a diameter that is larger than the diameter of the pipe. The mole 1000 is therefore substantially similar to the mole 900 depicted in Figs. 19, 20 and 21. Specifically, a pipe engagement region 1016 is generally defined as lying between two dotted pipe engagement lines 1020. The significant, novel features of the mole 1000 are found in the shape of a flange seal splitting fin and the method of engagement of the fin to the mole body 1004.

Page 23, Line 20 - Page 24, Line 10

Returning to Fig. 22, the fin 1030 resides in a fin engagement slot 1060 formed in the surface of the mole body 1004 such that the narrow frontward portion 1034 of the fin resides completely within the slot 1060. The rearward portion 1064 of the slot 1060 is formed with a corresponding approximately 80° angle, such that the rearward portion of the fin (defined by angle A) is matingly engaged therein. The frontward end 1070 of the slot 1060 includes a threaded bore 1074 for receiving a threaded screw 1078 having a tapered head 1082. The frontward edge 1086 of the slot 1060 is tapered to receive the head 1082 of the screw 1078 therewithin, and the tapered frontward tip 1038 of the fin 1030 is matingly engaged by the head

1082 of the screw 1078. It is therefore to be understood that the fin 1030 resides in the slot 1060 such that the frontward tip 1038 is held in place by the head 1082 of the screw 1078 and the rearward edge 1050 of the fin 1030 is held in place by the rearward end 1064 of the slot 1060 that has an angle A of approximately 80°. It will therefore be appreciated by those skilled in the art that the fin 1030 can easily be removed entirely for general pipe fracturing operations, and that the fin 1030 can be easily inserted should the need arise.

Page 25, Line 21 - Page 26, Line 6

An alternative method for the attachment of replacement pipe to the rearward end of a mole is depicted in Figs. 25 and 26, wherein Fig. 25 is a side elevational view of the replacement pipe attachment and Fig. 26 is a perspective view of the replacement pipe attachment sleeve. As depicted in Figs. 25 and 26 a mole 1200 has a tapered smooth body 1204 having a relatively narrow frontward end 1208 and a relatively wide rearward end 1212. A threaded, cylindrical sleeve engagement member 1216 is integrally formed with the mole body 1204 and projects rearwardly therefrom. As indicated hereabove, such a simple mole performs quite adequately for fracturable pipe such as cast iron and ceramic materials. In fact, such a smooth mole will even split steel pipe due to the large pulling forces applied to it.

Page 27, Line 14 - Page 28, Line 2

As was previously described with regard to cable puller 120, and with reference to Fig. 28, when the hydraulic pistons 510 are activated the forward end fixture 528 moves away from the front end block 1412. The rearward motion of the forward end fixture 528 causes the collets 560 to close upon and grab the cable 70, pulling it rearwardly (to the right in Fig. 28). Significantly, the front collets 1408 do not grab the cable 70 during the rearward motion caused by the movement of the fixture 528. After the fixture 528 has completed its stroke of generally two to six inches, the forward end fixture 528 returns to its starting position and, the collets 560 release their hold upon the cable and slide forwardly along the surface of the cable. As has been indicated hereabove, where significant resistive force exists in the cable, the cable may stretch, whereupon the cable will not remain stationary, but rather it returns to its unstretched condition. It has been experienced that a long cable may actually stretch one to three inches, thereby significantly reducing the cable motion gain of each stroke of the cable puller.

Page 28, Lines 3-18

The front collets 1408 are thus provided to prevent the cable from returning to its unstretched position. Specifically, after a cable pulling stroke, and assuming that there is some cable stretching within the cable, upon release of the rearward collets 560, the cable will tend to move towards its unstretched position which would be leftward in Fig. 28. At this point the forward collets 1408 engage the cable and, due to the tapered surfaces 1416 of the collets 1408 and the collet engagement surfaces 1420 of the block 1412, the collets 1408 engage the cable and prevent its leftward motion, thereby retaining the tension in the cable. The frontward collets 1408 thereby prevent leftward cable motion and increase the efficiency of the cable pulling device by insuring that each cable pulling stroke will pull the cable a full stroke length, without significant cable return motion upon cable release by the pulling collets 560. While various collet designs are suitable, as depicted in Fig. 29, the preferred collet design includes two cable engagement members 1408 that are rotatable about a collet engagement rod 1430, and which are pivotable about a rod engagement screw 1434. It is therefore to be understood that the improved PTR cable pulling device 1400 provides for cyclic pulling of the cable 70 while it prevents any cable return motion between pulling strokes due to the use of the forward cable engaging collets 1408.

In the Drawings

Please make the following drawing changes; a marked up copy in red is presented herewith.

Fig. 9, please add numerals 512 and 514 and change "514" (presently in the drawing) to --516--. These changes are made such that Fig. 9 corresponds to the specification, principally page 13, lines 1-5.

Fig. 19, please add the number 944. This change corresponds to the specification, page 22, line 2.

Fig. 22, please add the number 1012. This change is made in accordance with the specification, page 23, line 8.

Fig. 19, please change 916 to 914 as shown in red. This change, and a change in the specification, page 21, line 15, is made in that a duplicate numeral 916 which relates to the pipe engagement region is found in Fig. 19 and described on page 21, lines 16-18.

Fig. 24, please add numerals 1108 (nose portion) and 1164 (hex nut end) as described on page 24, line 14 and page 25, line 1, respectively.

Fig. 27, please change the number 1326 to 1316 as shown in red. This change corrects the drawing error, such that the drawing corresponds to the specification, page 27, line 4.

Fig. 29, please add the number 1404, such that the drawing corresponds to the specification, page 27, line 8.

In the Claims

Please renumber claims 10-48 as 9-47.

Please delete renumbered claims 3-5, 8-13, 18-25, 27-29, 31, 32 and 35, without prejudice.

Please amend the claims by substituting the following clean claims for like numbered (including renumbered) claims. A marked up copy of these amended claims is presented herewith as Attachment B. New claims 48-72 are submitted herewith, and a clean copy of all pending claims following this Amendment is included herewith as Attachment C.

1. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:
a mole;
a length of cable, said cable being engagable to said mole;
a cable pulling device being releasably engagable to said cable;
a cable pulling device mounting frame being releasably engagable to said cable pulling device; and wherein said cable pulling device is a post tensioning ram (PTR).

2. (Once amended) A device as described in claim 1 wherein said cable pulling device includes at least one pair of cable engaging collets that function to engage said cable on a said pulling stroke and to release said cable on a said recovery stroke; and wherein at least one further pair of collets is provided that function to engage said cable on said recovery stroke and release said cable on said pulling stroke.

6. (Once amended) A device as described in claim 2 wherein said further pair of collets is engaged within said cable pulling device.

7. (Once amended) A device as described in claim 6 wherein said cable pulling device is formed with a slotted cable insertion means for the sideways insertion of said cable within said cable pulling device.

14. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said cable being engagable to said mole;

a cable pulling device;

a cable pulling device mounting frame being releasably engagable to said cable pulling device wherein said cable pulling device mounting frame includes an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of said cable within said cable passage bore of said annulus member.

15. (Once amended) A device as described in claim 14 wherein said annulus member includes a cable pulling device holding means for releasably holding a portion of said cable pulling device therewithin.

16. (Once amended) A device as described in claim 14 wherein said cable pulling device mounting frame includes a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device.

17. (Once amended) A device as described in claim 16 wherein said annulus member is mountable in relation to said reaction plate such that said reaction plate disburses cable pulling forces exerted on said annulus by said cable pulling device.

26. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said cable being engagable to said mole;

a cable pulling device including a cable engagement mechanism and a cable pulling device engagement means functioning to provide a mounting structure for said cable pulling device;

said cable pulling device engagement means further including a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device, and

a cable pulling frame, said cable pulling frame being mountable to said reaction plate and said cable pulling device being mountable to said cable pulling frame.

30. (Once amended) A mole for use in the trenchless replacement of in-situ pipe, comprising, a nose portion being engagable to a cable, a tapered body portion and a replacement pipe engagement portion, the mole further including at least one blade, said tapered body portion acting to initially contact, fracture and expand said in-situ pipe for the replacement thereof with a length of replacement pipe, and said blade acting to cut pipe engagement devices encountered by the mole after said pipe has been expanded by said tapered body portion.

33. (Once amended) A mole as described in claim 30 wherein a threaded bore is formed within the mole, and wherein a mole engagement fixture is fixedly engaged to an end of said cable, said fixture including a threaded end portion that is threadably engagable with said threaded bore.

34. (Once amended) A mole as described in claim 33 wherein said fixture further includes a hex bolt portion integrally formed therewith and provided for the tightening of said threaded portion within said threaded bore.

36. A cable pulling device engagement frame comprising:

an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of a cable within said cable passage bore of said annulus member;

a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated through said annulus member.

37. (Once amended) A frame as described in claim 36 wherein said frame includes two cable pulling device engagement devices, such that two cable pulling devices can operationally function with said frame to pull two cables simultaneously.

38. (Once amended) A frame as described in claim 37 wherein two annulus members function as said engagement devices to engage said two cable pulling devices.

39. (Once amended) A frame as described in claim 38 wherein the two annulus members are angularly disposed relative to each other, such that two cable pulling devices are operationally engaged therewith.

40. (Once amended) A method for the trenchless replacement of in-situ pipe, comprising the steps of:

exposing a first end of said pipe;

exposing a second end of said pipe;

disposing a pulling cable through said pipe between said first end and said second end;

engaging a mole to said cable at said first end;

engaging a cable pulling device to said cable at said second end; and

installing a reaction plate at said second end after said cable is disposed through said pipe, and

pulling said mole through said pipe utilizing said cable pulling device.

41. (Once amended) A method as described in claim 40 wherein said second end is exposed within an excavated hole, and wherein a reaction plate is disposed against a sidewall of said hole.

42. (Once amended) A method as described in claim 41, further including the installation of a cable pulling device engagement frame between said reaction plate and said cable pulling device after said cable is disposed through said pipe.

43. (Once amended) A method as described in claim 42 wherein said frame includes a pulley for changing the direction of said cable.

44. (Once amended) A method as described in claim 43 wherein said cable pulling device is disposed within said hole.

45. A method as described in claim 43 wherein said frame and said cable pulling device are disposed within said hole.

46. (Once amended) A method as described in claim 40, including the further steps of:

engaging said cable with a first pair of collets on a cable pulling stroke of said cable pulling device, and

engaging said cable with a second pair of collets on a recovery stroke of said cable pulling device.

47. (Once amended) A method as described in claim 40 wherein said cable pulling device is a post tensioning ram (PTR).

Please insert the following new claims:

48. (New) A device for the trenchless replacement of in-situ pipe, comprising:
a mole;
a length of cable, said being engagable to said mole;
means for pulling said cable in a plurality of cable pulling strokes; and
means for releasably holding said cable between said cable pulling strokes.

49. (New) A device as described in claim 48, wherein said means for releasably holding said cable consists of a cable engaging device that grips said cable between said pulling strokes, and releases said cable on a pulling stroke.

50. (New) A device as described in claim 49, wherein said cable engaging device consists of a pair of collets.

51. (New) A device for the trenchless replacement of in-situ pipe, comprising:
a mole;
a length of cable, said being engagable to said mole;
a means for pulling said cable in a series of cyclic strokes that include a pulling stroke and a recovery stroke;
a first cable engaging member that engages said cable on said pulling stroke and releases said cable on said recovery stroke; and
a second cable engaging member that engages said cable on said recovery stroke and releases said cable on said pulling stroke.

52 (New) A device as described in claim 51 wherein said first cable engaging member is formed for the sideways insertion of said cable therewithin.

53. (New) A device as described in claim 52 wherein said first cable engaging member includes a pair of cable engaging collets.

54. (New) A device as described in claim 51 wherein said second cable engaging member is formed for the sideways insertion of said cable therewithin.

55. (New) A device as described in claim 54 wherein said second cable engaging member includes a pair of cable engaging collets.

56. (New) A device as described in claim 51 wherein said means for pulling said cable includes a cable pulling device and a cable pulling device mounting frame.

57. (New) A device as described in claim 56 wherein said frame is formed for the sideways insertion of said frame upon said cable.

58. (New) A device as described in claim 57, wherein said frame includes a rotatable pulley, and wherein said cable is mounted around said pulley.

59. (New) A device as described in claim 56 wherein said cable pulling device is engaged to said frame during a cable pulling stroke.

60. (New) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said being engagable to said mole;

a means for pulling said cable in a series of cyclic strokes including a pulling stroke and a recovery stroke; wherein said means for pulling said cable includes a cable pulling device and cable pulling device mounting frame;

wherein said frame includes a cable mounting means for the sideways mounting of said frame upon said cable, said mounting means including frame structural members and a pulley

member engaged therewith, and said frame structural members being disposed such that said frame may be placed upon a side surface of said cable to engage said cable with said pulley.

61. (New) A device as described in claim 60 wherein said frame structural members include side members and said pulley is rotatably engaged between said side members, and wherein said side members are spaced apart to form a cable path that runs between said side members and around said pulley.

62. (New) A device as described in claim 60, further including:

a first cable engaging member that engages said cable on said pulling stroke and releases said cable on said recovery stroke; and

a second cable engaging member that engages said cable on said recovery stroke and releases said cable on said pulling stroke.

63. (New) A device as described in claim 62 wherein said first cable engaging member is formed for the sideways insertion of said cable within said cable engaging member.

64. (New) A device as described in claim 63 wherein said first cable engaging member consists of a pair of cable engaging collets.

65. (New) A device as described in claim 62 wherein said second cable engaging member is formed for the sideways insertion of said cable within said second cable engaging member.

66. (New) A device as described in claim 65 wherein said second cable engaging member consists of a pair of cable engaging collets.

67. (New) A device as described in claim 60 wherein said cable pulling device is engaged to said frame during a cable pulling stroke.

68. (New) A method for the trenchless replacement of in-situ pipe having a first end and a second end, comprising the steps of:

disposing a cable through said pipe between said first end and said second end;

engaging a mole to said cable at said first end;

engaging a cable pulling means to said cable at said second end;

pulling said mole through said pipe utilizing said cable pulling means in a series of cyclic strokes including a pulling stroke and a recovery stroke; and

engaging said cable with a first cable engagement device on a cable pulling stroke, and engaging said cable with a second cable engagement device on a recovery stroke.

69. (New) A method as described in claim 68 further including the steps of:

pulling said cable utilizing a movable first cable engagement device during a cable pulling stroke; and

holding said cable in a stationary second cable engagement device during a said recovery stroke.

70. (New) A method as described in claim 68 wherein said cable pulling means includes a cable pulling device and a frame having said cable pulling device mounted thereto.

71. (New) A method as described in claim 70 wherein said step of engaging a cable pulling means to said cable includes the further step of placing said frame upon a side surface of said cable after said cable has been disposed through said pipe.

72. (New) A method as described in claim 71 wherein said frame includes side members and a pulley is engaged between said side members, and said side members are spaced apart to form a cable path that runs between said side members and around said pulley, such that said cable is engaged with said pulley when said frame is mounted upon said cable.

REMARKS

In this Preliminary Amendment claims having numbers between 1 and 47 have been amended to correspond to Applicant's first amendment thereto in the parent application; and new claims 48-72 have been added to further describe Applicant's invention.

Regarding the claims that are numbered between 1 and 47, each of these claims was once amended in response to a First Office Action, and was then rejected in the Second Office Action of the parent case. Each of the claims was then deleted from the parent case without prejudice for further prosecution in this continuation application. Applicant's arguments related to the allowability of these claims over the Second Office Action rejections and cited prior art are next presented. The Examiner's consideration of these remarks based upon the cited prior art is respectfully requested, and the Examiner's consideration of the new claims presented herewith is likewise respectfully requested.

In paragraphs 1 and 2 of the Second Office Action the Abstract is objected to for various reasons. Responsive thereto, a Substitute Abstract is provided herewith on a separate page.

In paragraph 3 of the Second Office Action it is indicated that prior objections to the claims were overcome by the prior response. No further response with respect thereto is deemed necessary in this Preliminary Amendment.

In paragraph 4 of the Second Office Action a problem with Applicant's numbering of the claims is discussed. Responsive thereto, the claims have been renumbered in this Preliminary Amendment, such that this ground of objection has been satisfied.

In paragraph 5 of the Second Office Action claims 30, 33 and 49 (renumbered) are objected to, stating:

> "In claim 30 at line 4, delete "said" and insert therefor --the--. Repeat the correction for claim 30 at line 6 (second occurrence) and claim 33 at line 2 (second occurrence).
> In claim 49 at line 2, immediately following "said" and prior to "two" insert --at least--"

Applicant has made the requested language corrections regarding claims 30 and 33; claim 49 is not a part of this Continuation Application.

In paragraphs 6 and 7 of the Second Office Action a rejection of prior claims 48 and 49 is stated. In that prior claims 48 and 49 are not a part of this Continuation Application, no further response hereto is deemed necessary in this Preliminary Amendment.

In paragraph 8 of the Second Office Action it is indicated that prior rejections of the claims under 35 U.S.C. § 112, second paragraph, were previously overcome. No further remarks concerning this paragraph are deemed required in this Preliminary Amendment.

In paragraphs 9 and 10 of the Second Office Action it is indicated that claims 30 and 33 are rejected under 35 U.S.C. § 102(e) as being anticipated by Lincoln, U.S. Patent No. 6,109,832, stating:

> "Lincoln '832 shows a mole for use in the trenchless replacement of in-situ pipe, the mole comprising:
> a nose portion (33) being engagable to a cable (14);
> a tapered body portion (40); and
> a replacement pipe engagement portion (60);
> said mole further including at least one blade (44);
> said tapered body portion acting to initially contact, fracture, and expand the in-situ pipe for the replacement thereof with a length of replacement pipe (25); and
> said at least one blade acting to cut pipe engagement devices encountered by said mole after the pipe has been expanded by said tapered body portion;
> wherein a threaded bore (43) is formed within said mole, and wherein a mole engagement fixture (30) is fixedly engaged to an end of the cable, said fixture including a threaded end portion (35) that is threadably engagable with said threaded bore."

Responsive thereto, Applicant respectfully traverses this ground of rejection and notes that both Fisk and Lincoln teach a mole wherein outwardly projecting fins or blades make contact with the pipe to fracture it. In distinction thereto, and as set forth in the claims, Applicant's mole makes contact with the pipe and fractures the pipe using a smooth tapered surface. While Applicant's mole further includes a blade for the subsequent cutting of pipe joint structures, the pipe fracturing as conducted by Applicant's mole is performed with a smooth tapered surface, not taught by Fisk or Lincoln.

Specifically, Claim 30 is an independent claim that is directed to the novel features of Applicant's mole. Claim 30 has been previously amended in response to the First Office Action in the parent application prosecution to include the further limitation that the tapered body portion of the mole initially contacts, fractures and expands the pipe. Prior art moles include fins

or other devices to either make initial contact with the pipe, or to fracture the pipe, or to expand the pipe. Applicant respectfully asserts that these limitations directed to Applicant's mole, as depicted in Figs. 19, 20 and 21, are neither taught by nor obvious from the cited prior art.

Claim 33 -- Claim 33 is dependent from claim 30 and recites limitations with regard to the engagement of the cable with the mole. Specifically, that a threaded mole engagement fixture is engaged to an end of the cable, and that the engagement fixture is threadably engagable with a threaded bore within the mole. Such a structure is depicted in Fig. 24. Applicant respectfully submits that the prior art does not teach such a cable engagement mechanism for a mole, and that therefore claim 33 recites allowable subject matter. Additionally, Applicant asserts that claim 33 is allowable as being dependent from an allowable base claim.

In paragraphs 11 and 12 of the Second Office Action claim 1 is rejected under 35 U.S.C. § 103 as being unpatentable over Fisk, in view of Poweram Model 7000; stating:

> "Fisk et al. '542 disclose a device for the trenchless replacement of in-situ pipe comprising:
> a mole (22);
> a length of cable (25), said cable being engagable to said mole;
> a cable pulling device (28) being releasably engagable to said cable; and
> a cable pulling device mounting frame (40) being releasably engagable to said cable pulling device (col. 6, lines 53 through 61).
> Fisk et al. '542 disclose all of the features of the claimed invention with the exception of:
> the cable pulling device being a post-tensioning ram (PTR).
> Poweram Model 7000 discloses a PTR designed for replacing existing utilities by pulling pipe splitting and/or bursting tools through an old pipe and pulling a new pipe into the same space.
> With respect to claim 1, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to modify the device shown by Fisk et al. '542 such that it would include a PTR as a cable pulling device as taught by Poweram Model 7000. The motivation would have been to include a pulling device capable of varying its grip in response to resistance during operation of the same."

Responsive thereto Applicant traverses this ground of rejection in that the Poweram Model 7000 reference (CC) is a rod pusher/puller and not a cable pulling device. As such, the Poweram Model 7000 is generally cumulative to the rod puller/pusher device depicted and described in Fisk.

In the following remarks, Applicant will first discuss the Fisk '542 reference and the post tensioning ram prior art described in the patent specification. The features of Applicant's device are then contrasted therewith, and the allowability of claim 1 is then discussed.

The Fisk '542 patent depicts and describes the use of a rod pusher/puller device as a cable pulling device. Such rod pusher/puller devices are well known in the industry, and Applicant submits herewith Exhibits CC and CD, wherein Exhibit CC depicts several Power Ram rod pusher/puller devices, and Exhibit CD depicts a pipe bursting system from Vermeer, Inc., a leader in the industry. It is significant that the Power Ram devices (Exhibit CC) are specifically identified in column 5, line 30 of the Fisk patent.

Turning to Exhibit CC, it depicts five power ram rod pusher/puller devices, providing perspective views that augment the side view provided in Fig. 1 of the Fisk '542 patent. Significantly, it is seen in the perspective views of Exhibit CC that the rod passes through an enclosed opening formed in the face of the rod pusher/puller device; this rod insertion feature is not visible from the side view of Fig. 1 of the Fisk '542 patent. In that the rods are engaged in sections (as opposed to a continuous cable), there is no motivation for the Power Ram rod pusher/puller to modify the enclosed opening in the face of the device.

With regard to Exhibit CD, it shows that the use of rod pusher/puller devices in the trenchless industry is ongoing. However, a significant feature depicted on pages 1 and 2 of Exhibit CD is the size of the hole that must be created to install the Vermeer rod pusher/puller equipment in-line with the pipe. It is to be noted that the Fisk '542 patent shows the pipe pusher/puller mounted out of the hole with a frame and pulley device installed within the hole; however, Fisk '542 does mention on col. 6, lines 53-61, that the rod pusher/puller can be installed in line within the hole as shown in the Vermeer information of Exhibit CD. Significantly, where the rod pusher/puller is installed in line (Exhibit CD) there is no need for a mounting frame, such as frame 40 of Fisk '542.

A significant feature of the Fisk '542 patent is that the rod pusher/puller is converted into a cable pulling device. However, Fisk '542 provides scant description about how this conversion is accomplished. Specifically, Fisk fails to disclose how the end of the cable is threaded through the rod passage hole of the rod pusher/puller, and it does not describe the clamps, jaws or other mechanical devices by which the cable is grabbed on a pulling stroke, subsequently released and grabbed again, although Fisk '542 does indicate that some type of repeated, reciprocal motion is achieved, in column 5, lines 25-30. Fisk '542, also fails to describe how the cable is fed through

or around the frame device 40 and the two pulleys of the frame. Furthermore, Fisk does not describe how the cable puller (converted rod pusher/puller) is engaged to the frame device 40, although it is stated in col. 6, lines 60-61 that it is "mounted atop" the frame 40.

Applicant's invention, as claimed, provides specific solutions, to various of these problems existing in the prior art, as shown in Fisk '542, and these features are next discussed with aid of Exhibit CE, which depicts the prior art post tensioning ram (PTR) device, also depicted in Fig. 9 of the Application.

A first inventive feature of Applicant's invention, as claimed in amended claim 1, is the use of a post tensioning ram (PTR) as a cable pulling device. Such a PTR is depicted in Fig. 9 of the Application and described therein, and Exhibit CE includes depictions and descriptions of a Power Team PTR device such as may be used in Applicant's invention. As can be seen from Exhibit CE, the Power Team PTR includes one pair of cable grippers (or collets), and a detachable nose piece that is slotted, such that the cable is sideways insertable into the PTR device. Such PTR devices are typically used in fabricating concrete structures where the individual cables are pulled taut by the PTR devices and a wedge, that fits within an anchor, is used to hold the cable under stressed tension. After the cable is properly stressed, it is held in place by the wedge and anchor, and the PTR device is removed and sideways inserted onto a subsequent cable for the stress tensioning of that cable. Such PTR devices are therefore used to stress tension all of the steel cables, whereupon concrete is then poured. Additionally, such PTR devices have also been used in the bridge building industry to pull bridge cables taut to a predetermined stress.

To Applicant's knowledge, a PTR device has never been utilized in an application similar to Applicant's. That is, to pull an object (the mole) at the end of a long cable (such as 1,000 feet). The PTR uses that are known to the Applicant all include situations where one end of the cable is fixed and the PTR is engaged to the other end of the cable to apply a tensioning stress to the cable, and a separate anchor/wedge piece holds the cable under tension, and the PTR device is removed from the cable. The use of a PTR to pull a long length of cable is generally unanticipated because winches and other devices can more rapidly pull long cable lengths than a PTR. That is, a PTR's pulling stroke is less than one foot, whereupon it recycles to pull another short length. Winches and similar devices are typically used to pull long lengths of cable because they do not function by repeated pulling of short lengths.

Regarding amended claim 1, Applicant submits that the use of a PTR within Applicant's trenchless replacement system is novel, and claim 1 specifically recites the use of a PTR. Fisk '542 clearly does not teach the use of a PTR device, but rather a rod pusher/puller device that is somehow converted to pull a cable. Furthermore the use of a PTR with a mounting frame (as set forth in amended claim 1) is likewise novel and not taught by Fisk '542. Applicant asserts its arguments that the use of a PTR to pull an object, such as the mole, at the end of a long cable is non-obvious and therefore patentable. Thus Applicant respectfully asserts that claim 1 recites allowable subject matter.

In paragraph 13 of the Second Office Action claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisk et al., stating:

> "Fisk et al. '542 disclose a device for the trenchless replacement of in-situ pipe comprising:
> a mole (22);
> a length of cable (25), said cable being engagable to said mole;
> a cable pulling device (28) being releasably engagable to said cable; and
> a cable pulling device mounting frame (40) being releasably engagable to said cable pulling device (col. 6, lines 53 through 61).
> Fisk et al. '542 disclose all of the features of the claimed invention with the exception of:
> the cable pulling device mounting frame including an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of said cable within said cable passage bore for the sideways insertion of said cable within said cable passage bore.
> With respect to claim 14, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to modify the mounting frame of the device shown by Fisk et al. '542 such that it would include a cable insertion slot formed through portions of the annulus member. The motivation would have been for positioning of the cable and ease of installation of the device as the cable would not have to be "threaded" through the mounting frame."

Responsive thereto, Applicant traverses this ground of rejection in that the Fisk reference does not teach nor suggest the use of an annulus member, nor does it teach the formation of a cable insertion slot through such an annulus member.

Claim 14 includes the use of an annulus member within the mounting frame of Applicant's device. No such annulus member, and particularly one having a cable passage bore and sideways cable insertion slot, is taught in the mounting frame of the Fisk patent or in other known prior art. Applicant therefore asserts that claim 14 recites allowable subject matter.

In paragraph 14 of the Second Office Action claims 16, 17, 26 and 36-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisk in view of Vermeer; stating:

> "Fisk et al. '542 disclose all of the features of the claimed invention with the exceptions of:
> the mounting frame including a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by the cable pulling device; and
> the annulus member being mountable in relation to the reaction plate such that the reaction plate will disburse cable pulling forces exerted on the annulus by the cable pulling device.
> Vermeer shows a pipe-bursting device comprising a cable pulling device installed in an excavation for pulling an pipe-bursting tool through an existing pipeline, and further including a reaction plate having an enlarged surface positioned between a wall of the excavation and the cable pulling device.
> With respect to claims 16, 26, and 36, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to modify the device shown by Fisk et al. '542 such that it would include a reaction plate as taught by Vermeer. The motivation would have been to include a means of resistance to the cable pulling force whereby the cable pulling device would remain relatively stable.
> With respect to claim 17, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to further modify the device shown by Fisk et al. '542 such that the annulus member would be mountable in relation to the reaction plate such that the reaction plate will disburse cable pulling forces exerted on the annulus by the cable pulling device. The motivation would have been to provide continuity between the various components of the device thereby effectively transferring force during use of the same.
> With respect to claims 37 through 39, a duplication of parts is not considered be of patentable merit. As such, Applicants' claimed invention is anticipated by the device shown by Fisk et al. '542 and in view of the above statements of obviousness.
> With respect to claims 40 through 45, the method steps and associated structural limitations recited therein are considered to inherent to the installation of the device shown by Fisk et al. '542 as modified above by Vermeer."

Regarding claims 16, 26 and 36, the allowability of these claims is next discussed.

With regard to claim 16 -- Claim 16 is amended to be dependent from independent claim 14 (rather than claim 1); it includes the use of a reaction plate for disbursing a reaction force generated by the cable pulling device. While the Vermeer device depicted in Exhibit CD includes a depiction of a type of plate at the exit hole, the reaction plate is not seen as being part of a cable pulling device mounting frame, and Applicant also relies on its remarks set forth hereabove with regard to the allowability of claim 14 in asserting that claim 16 recites allowable subject matter.

With regard to Claim 26 -- Claim 26 is an independent claim for the trenchless replacement device. It includes the mole, the cable, a cable pulling device and a cable pulling device engagement means which provides a mounting structure for the cable pulling device. The detailed limitations of the cable pulling device engagement means include a reaction plate and a cable pulling frame that is mountable to the reaction plate, wherein the cable pulling device is mountable to the cable pulling frame. As depicted in Exhibit CD, the Vermeer device apparently includes a reaction plate; however, the cable pulling device (rod pusher/puller) is apparently abutted against the reaction plate. That is, there is no cable pulling frame in Vermeer that is disposed between the cable pulling device and the reaction plate. Fisk '542 does not appear to include a reaction plate. It teaches a cable pulling device that is mounted on top of a cable pulling frame 40, however no reaction plate is taught.

Applicant respectfully traverses this ground of rejection and asserts that Fisk '542 does not teach such a reaction plate, nor the mounting of a cable pulling device frame to it. Applicant therefore respectfully submits that claim 26 recites limitations that are neither taught by nor obvious from the cited prior art.

With regard to Claim 36 -- Claim 36 is a non-amended independent claim that is directed to the cable pulling device engagement frame of the present invention. Claim 36 includes limitations directed to the annulus member having a cable passage bore and a cable insertion slot for the sideways insertion of the cable within the annulus member, as well as limitations directed to the reaction plate. This basic cable pulling device engagement frame is depicted in Figs. 16, 17 and 18.

Applicant asserts that Fisk '542 teaches neither an annulus member nor a reaction plate, and that although Vermeer teaches a reaction plate it therefore cannot be obvious from the teachings of Fisk '542 and Vermeer to combine an annulus member and a reaction plate to form a cable pulling device engagement frame, as depicted in Figs. 16-18 of the Application. Applicant therefore respectfully submits that claim 36 recites subject matter that is not obvious from the teachings of Fisk '542 and Vermeer, and that claim 36 therefore recites allowable subject matter.

Further responsive to this paragraph 14 of the Second Office Action, and regarding claim 17, it is stated:

> "With respect to claim 17, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to further modify the device shown by Fisk et al. '542 such that the annulus member would be mountable in relation

to the reaction plate such that the reaction plate will disburse cable pulling forces exerted on the annulus by the cable pulling device. The motivation would have been to provide continuity between the various components of the device thereby effectively transferring force during use of the same."

Claim 17 is dependent from claim 16 and it includes the use of an annulus member in association with the reaction plate for mounting the cable pulling device. Such a structure is depicted in Figs.16, 17 and 18 of the Application. Applicant submits that claim 17, recites subject matter that is not taught nor obvious from the prior art, and therefore includes allowable subject matter.

Further responsive to this paragraph 14 of the Second Office Action, and regarding claims 37-39, it is stated:

"With respect to claims 37 through 39, a duplication of parts is not considered be of patentable merit. As such, Applicants' claimed invention is anticipated by the device shown by Fisk et al. '542 and in view of the above statements of obviousness."

Applicant traverses this ground of rejection in that the device claimed in claims 37-39 is not simply a duplication of parts, but rather a singular frame device that is modified to operate with two cable pulling devices. It is not two frame set side by side, as a mere duplication of parts would be. Each claim is separately discussed.

Claim 37 -- Claim 37 is dependent from independent claim 36 and includes the further limitation that the frame includes two cable pulling device engagement devices, such that two cable pulling devices can operationally function with the single frame to pull two cables simultaneously. This device is depicted in Figs. 30-33. There is no teaching in the prior art with regard to the use of two cable pulling device engagement devices within a single frame. Moreover, there is no teaching in the prior art with regard to any use of two cable pulling devices within a trenchless replacement system. Applicant therefore respectfully submits that claim 36 recites subject matter that is not obvious from the cited prior art, such that it contains allowable subject matter. Additionally, Applicant asserts that claim 37 is allowable as being dependent from an allowable base claim.

Claim 38 -- Claim 38 is dependent from claim 37 and recites the further limitation that two annulus members are utilized to engage the two cable pulling devices. The non-obviousness of Applicant's annulus members as utilized to engage a cable pulling device has been argued hereabove. Applicant relies on those remarks, and the dependency of claim 38 from allowable base claim 37 to assert that claim 38 is allowable.

Claim 39 -- Claim 39 is dependent from claim 38 and recites the angular disposition of the two annulus members relative to each other, as is depicted in Figs. 30-33. Applicant relies on its remarks set forth hereabove with regard to the use of such annulus members as cable pulling device engagement members, and Applicant further notes that claim 39 is dependent from claim 38. Applicant asserts that claim 39 is therefore allowable.

Further responsive to this Paragraph 14 of the Second Office Action, and regarding claims 40-45, it is stated:

> "With respect to claims 40 through 45, the method steps and associated structural limitations recited therein are considered to inherent to the installation of the device shown by Fisk et al. '542 as modified above by Vermeer."

Claim 40 is an independent method claim which recites Applicant's method for the trenchless replacement of pipe, and Applicant has previously amended claim 40 in response to the First Office Action in the parent case, whereby Applicant respectfully traverses this ground of rejection with regard to amended claim 40. Claim 40 has been amended to include the further limitation that the reaction plate is installed after the cable is disposed through the pipe, and Applicant asserts that claim 40 recites subject matter that is neither taught by nor obvious from the cited prior art. Specifically, Applicant asserts that Fisk '542 does not teach the use of a reaction plate. However, in the Vermeer device of Exhibit CD, a reaction plate is depicted. However, a close examination of Exhibit CD reveals that the reaction plate includes a circular opening for the passage of the pipes of the pipe pusher/puller device. Vermeer does not teach in Exhibit CD the use of a long cable, but rather pipe segments that are joined together as they are used, and where such segmented pipes are utilized, they can be assembled to pass through the enclosed reaction plate opening. Conversely, where a cable is used, if the reaction plate has an enclosed opening (a hole), the cable must pass through the reaction plate before the cable is inserted into the pipe. Applicant's reaction plate, as depicted in Fig. 8, includes a U-shaped opening which allows the reaction plate to be installed at the cable's second end, after the cable is disposed through the pipe; that is, onto a side surface of the cable. Such a reaction plate design is neither taught by nor obvious from the prior art teachings, whereby Applicant asserts that claim 40 recites allowable subject matter.

Claim 41 -- Claim 41 is dependent from claim 40, and Applicant relies on the allowability of claim 40 in asserting that dependent claim 41 also recites allowable subject matter.

Claim 42 -- Claim 42 is dependent from claim 41 and includes the further limitations of a cable pulling device engagement frame being installed between the reaction plate and the cable pulling device after the cable is disposed through the pipe. This limitation basically relies on the sideways insertion of the frame upon the cable, such that the frame can be installed upon the cable at the cable is disposed through the pipe. In devices such as Fisk '542, the frame is inserted within the hole at the second end prior to the insertion of the cable through the pipe, or the frame would rest on top of the cable. Specifically, as depicted in Exhibit CC, the frame of the cable pusher/puller of Fisk '542 is not sideways mountable upon the cable, such that the cable must be passed through the end opening in the rod pusher/puller frame and then into the pipe. Applicant therefore respectfully submits that claim 42 recites limitations that are neither taught by nor obvious from the prior art, whereby claim 42 recites allowable subject matter. Additionally, Applicant further asserts that claim 42 is allowable as being dependent upon allowable base claims.

Claim 43 is dependent from claim 42 and further includes a pulley within the frame. Applicant notes that claim 43 is dependent from claim 42, and Applicant asserts that claim 43 is allowable as depending from an allowable base claim.

Claim 44 is amended to be dependent from claim 42 and includes the further limitation that the cable pulling device is disposed within the hole. Applicant notes that Fisk '542 includes a cable mounting frame including a pulley that is disposed within the hole, however the cable pulling device is mounted on top of the frame and outside of the hole. Applicant further notes that the Vermeer prior art of Exhibit CD includes a rod pusher/puller device that is mounted within the hole, however Vermeer does not include a mounting frame that includes the pulley set forth in claim 43. The basic novelty of this claim is a result of the unique, lightweight and modular nature of Applicant's invention, as depicted in Fig. 1, particularly, that it includes a lightweight frame and a lightweight cable pulling device, such that both of these devices are installable within the hole. Applicant therefore respectfully submits that the prior art neither teaches nor renders obvious the limitations set forth in claim 44, such that claim 44 recites allowable subject matter. Applicant further notes that claim 44 is a dependent claim, and Applicant asserts that claim 44 is also allowable as being dependent from an allowable base claim.

Claim 45 -- Claim 45 is dependent from claim 43 and includes the limitation that both the frame and the cable pulling device are disposed within the hole. Applicant relies on its remarks

set forth hereabove with regard to claim 44, and Applicant further asserts that claim 45 is allowable as being dependent from an allowable base claim.

In paragraph 15 of the Second Office Action claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lincoln 6,109,832, stating:

> "Lincoln '832 shows all of the features of the claimed invention with the exception of:
> the fixture further including a hex bolt portion integrally formed therewith and provided for the tightening of the threaded portion within the threaded bore.
> It would have been obvious to one of ordinary skill in the art of earth boring at the time of invention to modify the device shown by Lincoln '832 such that its body would include a hex bolt portion integrally formed therewith. The motivation would have been to facilitate tightening of the threaded portion within the threaded bore with a wrench or other tool."

Applicant notes that claim 34 is dependent from claim 33 which is dependent from independent claim 30. Responsive thereto, Applicant traverses this ground of rejection. Claim 34 is dependent from claim 33 and recites the further limitation that the cable end fixture includes a hex bolt portion for tightening the cable fixture with the threaded mole bore; such a limitation is depicted in Fig. 24. Applicant submits that this limitation is neither taught by nor obvious from the recited prior art, and that claim 34 therefore recites allowable subject matter. Additionally, Applicant asserts that claim 34 is allowable as a dependent claim which depends from an allowable base claim.

In paragraph 16 of the Second Office Action claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisk, in view of Vermeer, and further in view of Poweram Model 7000, stating:

> "Fisk et al. '542 in view of Vermeer disclose all of the method steps and associated structural limitations of the claimed invention with the exception of:
> the cable pulling device being a PTR.
> Poweram Model 7000 discloses a PTR designed for replacing existing utilities by pulling pipe splitting and/or bursting tools through an old pipe and pulling a new pipe into the same space.
> With respect to claim 47, it would have been obvious to one of ordinary skill in the art of pipe laying at the time of invention to modify the device shown by Fisk et al. '542 as modified above by Vermeer such that it would include a PTR for a cable pulling device as taught by Poweram Model 7000. The motivation would have been to include a pulling device capable of varying its grip in response to resistance during operation of the same."

Applicant notes that claim 47 depends from independent claim 40 and it recites the further limitation that the cable pulling device is a post tensioning ram (PTR). Applicant traverses this ground of rejection in that the Vermeer prior art reference is not a cable pulling device, and the Poweram Model 7000 reference is also not a cable pulling device.

Applicant relies on its remarks set forth hereabove with regard to the allowability of claim 1, which includes the use of a PTR, and Applicant further asserts that claim 47 is allowable as a dependent claim which depends from an allowable base claim (independent claim 40).

In paragraphs 17, 18 and 19 of the Second Office Action, allowable subject matter is indicating, stating:

> "Claims 2, 6, 7, 11 through 13, 15, 18 through 25, 27 through 29, 31, 32, 35, and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."

The statement of reasons (paragraph 18) states:

> "With respect to claims 2, 6, 7, 12, 13, and 15, modification of the Poweram Model 7000 device to include the collets is precluded in that the reference is silent with respect to the same and actually appears to teach away from the claimed subject matter with the disclosure of a "jaw system."

Initially Applicant notes that claims 11-13, 18-25, 27-29, 31, 32 and 35 have been deleted from this Continuation Application without prejudice. Thus, with regard to paragraphs 17 and 18, the claims remaining in this application are 2, 6, 7, 15, and 46. Applicant appreciates the indication of allowable subject matter within these claims; however, Applicant has asserted hereinabove that the claims from which these claims depend are allowable, and based thereon, Applicant asserts that these claims are allowable in their current form.

With regard to claims 2 and 46 that include multiple sets of collets in a post tensioning ram, reference is made to the post tensioning ram on page 3 of item CE of Applicant's Information Disclosure Statement, which, in the bottom third of page 3 depicts and describes a collet set for use in a PTR. As taught therein, the collet set is selectable for different diameter cables. With regard to Applicant's invention, and claims such as claims 2 and 46, it is significant that the PTR device depicted in reference CE includes only one set of collets.

In paragraph 20 of the Second Office Action Applicant's arguments filed January 9, 2001 are commented upon, stating:

"With respect to Applicants' statements regarding the Poweram devices and no known use of the same to pull lengths of cable attached to bursting rams or moles through ground, the Examiner notes the express disclosure of the same for pipe rehabilitation applications in the Poweram Model 7000 brochure."

Responsive thereto, Applicant notes that the Poweram 7000 device is a rod puller/pusher which operates in a significantly different manner from a cable pulling device. Specifically, the Poweram devices are not cable pulling devices, much less post tensioning ram (PTR) type cable pulling devices as are depicted in reference CE of Applicant's Information Disclosure Statement.

In paragraph 21 of the Second Office Action comment is made regarding Applicant's arguments with respect to claims 1, 30, 33 and 34, as well as claims 14, 16, 17 and 36-39. Responsive thereto, Applicant has addressed these arguments and provided further arguments as set forth hereabove.

In these remarks Applicant has responded to the paragraphs of the Second Office Action that were directed to the claims set forth in this Continuation Application. Applicant submits that these claims recite patentable subject matter, and are therefore allowable.

Additionally, Applicant has provided new claims 48-72 herewith. Applicant respectfully requests examination of these new claims. Should the Examiner have any questions or comments with regard to these remarks, a telephonic conference at the number set forth below is respectfully requested.

Respectfully submitted,

Dated: August 24, 2001

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CERTIFICATE OF MAILING (37 CFR 1.10(A))

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Date: August 24, 2001

REPLACEMENT ABSTRACT

The basic features of the invention include a pipe parting mole, a length of cable that is engagable to the mole, a cable pulling device and a cable pulling device engagement means that provides a mounting structure for the cable pulling device. The cable pulling device engagement means generally includes a reaction plate and a structure for removably engaging the cable pulling device therewithin. A cable pulling frame may be advantageously used to facilitate the removal of the cable from a relatively small hole that is created at the pulling end of the pipe.

ATTACHMENT A

MARKED UP COPY OF SPECIFICATION PARAGRAPHS

Page 1, Lines 5-9

The present invention is a continuation application of copending U.S. Patent application Serial No. 09/350,948, filed July 9, 1999, which is a continuation-in-part application, based upon and claiming priority to pending International Patent Application Serial No. PCT/US98/00266, filed January 9, 1998 by the inventors hereof; which application claims priority to U.S. Provisional Patent Application Serial No. 60,035,174, filed January 9, 1997 by the inventors hereto to which priority is claimed.

Page 13, Lines 1-17

A cable pulling device that is suitable for use in the present invention is depicted in a side elevational view in Fig. [8] 9 and a cable engaging collet of the cable puller is depicted in Fig. [9] 10. The cable puller 120 is preferably formed with two parallelly disposed hydraulic pistons 510 having outer piston housings 512 that are mounted at their rearward ends 514 to a rear end fixture 516. A forward end fixture 528 is engaged to the forward ends of the outer housings 512. The hydraulic lines 132 are engaged to the end fixtures 516 and 528 through a suitable coupling 518 such that hydraulic fluid passes through the hydraulic lines 132, through the end fixtures 516 and 528 and into the two hydraulic pistons 510. Hydraulic push rods 524 project outwardly from the forward end fixture 528 and are fixedly engaged to a front end block 536. A slotted, generally cylindrical nose piece 540 is engaged to the front end block 536. The nose piece 540 is formed with a cable passage slot 544 cut through a side of the nose piece 540, and the outer diameter of the nose piece 540 is sized to mount within the shoulder 434 of the slotted annulus 124 of the frame member 84, as is described hereinbelow with the aid of Fig. 11. A generally U-shaped cable passage slot, generally denoted by the numeral 550 is formed in each of the front end block 536, forward end fixture 528 and the rear end fixture 514, such that the cable 70 can be installed within the cable pulling device 120 from its side. That is, it is not necessary to thread an end of the cable 70 through the cable pulling device 120.

Page 21, Lines 8-23

A further mole design 900 is depicted in Figs. 19, 20 and 21, wherein Fig. 19 is a side elevational view of the mole 900 depicted in a pipe bursting operation; Fig. 20 is a front elevational view of the mole 900 and Fig. 21 is a side elevational view of the mole 900 depicted in a further stage of a pipe bursting operation. As depicted in Fig. 19, the mole 900 is being pulled through a pipe 904 composed of fracturable material, such as cast iron or ceramic pipe. A pulling cable 70 is engaged to the mole 900 as has generally been described hereinabove. The mole 900 includes a tapered body portion 908 having a front end 912 whose diameter is less than the diameter of the pipe 904 and a rearward end [916] 914 whose diameter is greater than the diameter of the pipe 904. The tapered body 908 of the mole engages the pipe at a pipe engagement region 916 generally existing between the dotted pipe engagement lines 920, such that a forward, intact section of pipe 924 exists in front of the engagement lines 920 and fractured pipe segments 928 exist behind the pipe engagement lines 920. It is therefore to be understood that a generalized outward force that is uniformly, circumferentially applied to the pipe 904 in the engagement region 916 causes the pipe material to fracture due to the large pulling force applied to the mole 900 through the cable 70. Therefore, in the mole embodiment 900 a smooth tapered surface mole is utilized to burst the fracturable pipe 904.

Page 22, Line 11 - Page 23, Line 3

A single blade 980 may be engaged within a blade holding slot 984 to project from the side of the tapered body portion 908. Significantly, the frontward edge 988 of the blade 980 is disposed rearwardly of the pipe fracturing region [716] 916, such that the blade 980 is not utilized in the pipe fracturing activity of the mole 900. The blade 980 is utilized where the mole 900 encounters pipe engagement fixtures such as the pipe flanges 990 which include a flexible seal 994. Specifically, as depicted in Fig. 21 and in comparison to Fig. 19, the mole 900 has been pulled (leftward) through the pipe 904 past the flange members 990, such that the pipe around the flange members has been fractured. Nevertheless, the flexible seal member 994 has remained intact. In testing with smooth tapered surface moles, the inventors have found that such moles work very well in fracturing pipe, however seals such as 994 sometimes create significant drag. Blade 980 thus augments the mole 900 by providing a sharp edge which will cut through the seal 994, whereby it will pass around the mole and not create a drag problem. It

is therefore the case that a smooth tapered mole, without any fins is quite adequate to fracture and replace fracturable pipe such as cast iron and ceramic. Where certain types of pipe joinder fixtures are encountered, a blade 980 may be required to efficiently remove portions of the pipe engagement fixture from around the mole.

Page 23, Lines 4-13

Still further alternative mole designs are depicted in Figs. 22 and 23, wherein Fig. 22 is a side elevational view depicting an alternative fin design with a mole, and Fig. 23 is a side elevational view of the fin depicted in Fig. 22. As depicted in Fig. 22, a mole 1000 is formed with a tapered body portion [1001] 1004 having a front end 1008 whose diameter is less than the diameter of a pipe (not shown) through which the mole will be pulled, and a rearward end 1012 having a diameter that is larger than the diameter of the pipe. The mole 1000 is therefore substantially similar to the mole 900 depicted in Figs. 19, 20 and 21. Specifically, a pipe engagement region 1016 is generally defined as lying between two dotted pipe engagement lines 1020. The significant, novel features of the mole 1000 are found in the shape of a flange seal splitting fin and the method of engagement of the fin to the mole body 1004.

Page 23, Line 20 - Page 24, Line 10

Returning to Fig. 22, the fin 1030 resides in a fin engagement slot 1060 formed in the surface of the mole body 1004 such that the narrow frontward portion [1042] 1034 of the fin resides completely within the slot 1060. The rearward portion 1064 of the slot 1060 is formed with a corresponding approximately 80° angle, such that the rearward portion of the fin (defined by angle A) is matingly engaged therein. The frontward end 1070 of the slot 1060 includes a threaded bore 1074 for receiving a threaded screw 1078 having a tapered head 1082. The frontward edge 1086 of the slot 1060 is tapered to receive the head 1082 of the screw 1078 therewithin, and the tapered frontward tip 1038 of the fin 1030 is matingly engaged by the head 1082 of the screw 1078. It is therefore to be understood that the fin 1030 resides in the slot 1060 such that the frontward tip 1038 is held in place by the head 1082 of the screw 1078 and the rearward edge 1050 of the fin 1030 is held in place by the rearward end 1064 of the slot 1060 that has an angle A of approximately 80°. It will therefore be appreciated by those skilled in the

art that the fin 1030 can easily be removed entirely for general pipe fracturing operations, and that the fin 1030 can be easily inserted should the need arise.

Page 25, Line 21 - Page 26, Line 6

An alternative method for the attachment of replacement pipe to the rearward end of a mole is depicted in Figs. 25 and 26, wherein [Fig. 5] Fig. 25 is a side elevational view of the replacement pipe attachment and [Fig. 6] Fig. 26 is a perspective view of the replacement pipe attachment sleeve. As depicted in Figs. 25 and 26 a mole 1200 has a tapered smooth body 1204 having a relatively narrow frontward end 1208 and a relatively wide rearward end 1212. A threaded, cylindrical sleeve engagement member 1216 is integrally formed with the mole body 1204 and projects rearwardly therefrom. As indicated hereabove, such a simple mole performs quite adequately for fracturable pipe such as cast iron and ceramic materials. In fact, such a smooth mole will even split steel pipe due to the large pulling forces applied to it.

Page 27, Line 14 - Page 28, Line 2

As was previously described with regard to cable puller 120, and with reference to [Fig. 25] Fig. 28, when the hydraulic pistons 510 are activated the forward end fixture 528 moves away from the front end block 1412. The rearward motion of the forward end fixture 528 causes the collets 560 to close upon and grab the cable 70, pulling it rearwardly (to the right in Fig. 28). Significantly, the front collets 1408 do not grab the cable 70 during the rearward motion caused by the movement of the fixture 528. After the fixture 528 has completed its stroke of generally two to six inches, the forward end fixture 528 returns to its starting position and, the collets 560 release their hold upon the cable and slide forwardly along the surface of the cable. As has been indicated hereabove, where significant resistive force exists in the cable, the cable may stretch, whereupon the cable will not remain stationary, but rather it returns to its unstretched condition. It has been experienced that a long cable may actually stretch one to three inches, thereby significantly reducing the cable motion gain of each stroke of the cable puller.

Page 28, Lines 3-18

The front collets 1408 are thus provided to prevent the cable from returning to its unstretched position. Specifically, after a cable pulling stroke, and assuming that there is some

cable stretching within the cable, upon release of the rearward collets 560, the cable will tend to move towards its unstretched position which would be leftward in Fig. 28. At this point the forward collets 1408 engage the cable and, due to the tapered surfaces 1416 of the collets 1408 and the collet engagement surfaces 1420 of the block 1412, the collets 1408 engage the cable and prevent its leftward motion, thereby retaining the tension in the cable. The frontward collets 1408 thereby prevent leftward cable motion and increase the efficiency of the cable pulling device by insuring that each cable pulling stroke will pull the cable a full stroke length, without significant cable return motion upon cable release by the pulling collets 560. While various collet designs are suitable, as depicted in Fig. 29, the preferred collet design includes two cable engagement members [560 and] 1408 that are rotatable about a collet engagement rod 1430, and which are pivotable about a rod engagement screw 1434. It is therefore to be understood that the improved PTR cable pulling device 1400 provides for cyclic pulling of the cable 70 while it prevents any cable return motion between pulling strokes due to the use of the forward cable engaging collets 1408.

ATTACHMENT B - VERSION OF AMENDED CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

1. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said cable being engagable to said mole;

[a cable pulling means including] a cable pulling device <u>being releasably engagable to said cable;</u> [and]

a cable pulling device [engagement means functioning to provide a] mounting [structure for] <u>frame being releasably engagable to</u> said cable pulling device[.] <u>; and wherein said cable pulling device is a post tensioning ram (PTR).</u>

2. (Once amended) A device as described in claim 1 wherein said cable pulling device includes [a cable engagement mechanism that functions to pull said cable in a plurality of repeated cyclic pulling strokes.] <u>at least one pair of cable engaging collets that function to engage said cable on a said pulling stroke and to release said cable on a said recovery stroke; and wherein at least one further pair of collets is provided that function to engage said cable on said recovery stroke and release said cable on said pulling stroke.</u>

6. (Once amended) A device as described in claim [5] <u>2</u> wherein said further <u>pair of</u> collet<u>s</u> is engaged within said cable pulling device.

7. (Once amended) A device as described in claim [2] <u>6</u> wherein said cable pulling device is formed with a slotted cable insertion means for the sideways insertion of said cable within said cable pulling device.

<u>14.</u> [15.] (Once amended) [A device as described in claim 1] <u>A device for the trenchless replacement of in-situ pipe, comprising:</u>

a mole;

a length of cable, said cable being engagable to said mole;

a cable pulling device;

a cable pulling device mounting frame being releasably engagable to said cable pulling device wherein said cable pulling device [engagement means] mounting frame includes an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of said cable within said cable passage bore of said annulus member.

15. [16.] (Once amended) A device as described in claim [15] 14 wherein said annulus member includes a cable pulling device holding means for releasably holding a portion of said cable pulling device therewithin.

16. [17.] (Once amended) A device as described in claim [1] 14 wherein said cable pulling device [engagement means] mounting frame includes a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device.

17. [18.] (Once amended) A device as described in claim [17] 16 wherein said [cable pulling device engagement means includes an annulus member that is releasably engagable with said cable pulling device, and wherein said] annulus member is mountable in relation to said reaction plate such that said reaction plate disburses cable pulling forces exerted on said annulus by said cable pulling device.

26. [27.] (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said cable being engagable to said mole;

[a cable pulling means including] a cable pulling device including a cable engagement mechanism and a cable pulling device engagement means functioning to provide a mounting structure for said cable pulling device;

said cable pulling device engagement means further including a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device, and

a cable pulling frame, said cable pulling frame being mountable to said reaction plate and said cable pulling device being mountable to said cable pulling frame.

30. [31.] (Once amended) A mole for use in the trenchless replacement of in-situ pipe, comprising, a nose portion being engagable to a cable, a tapered body portion and a replacement pipe engagement portion, [said] the mole further including at least one blade, said tapered body portion acting to initially contact, fracture and expand said in-situ pipe for the replacement thereof with a length of replacement pipe, and said blade acting to cut pipe engagement devices encountered by [said] the mole after said pipe has been expanded by said tapered body portion.

33. [34.] (Once amended) A mole as described in claim [31] 30 wherein a threaded bore is formed within [said] the mole, and wherein a mole engagement fixture is fixedly engaged to an end of said cable, said fixture including a threaded end portion that is threadably engagable with said threaded bore.

34. [35.] (Once amended) A mole as described in claim [34] 33 wherein said fixture further includes a hex [nut] bolt portion integrally formed therewith and provided for the tightening of said threaded portion within said threaded bore.

36. [37.] A cable pulling device engagement frame comprising:

an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of a cable within said cable passage bore of said annulus member;

a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated through said annulus member.

37. [38.] (Once amended) A frame as described in claim [37] 36 wherein said frame includes two cable pulling device engagement devices, such that two cable pulling devices can operationally function with said frame to pull two cables simultaneously.

38. [39.] (Once amended) A [device] frame as described in claim [38] 37 wherein two annulus members function as said engagement devices to engage said two cable pulling devices.

39. [40.] (Once amended) A [device] frame as described in claim [39] 38 wherein the two annulus members are angularly disposed relative to each other, such that two cable pulling devices are operationally engaged therewith.

40. [41.] (Once amended) A method for the trenchless replacement of in-situ pipe, comprising the steps of:

exposing a first end of said pipe;

exposing a second end of said pipe;

disposing a pulling cable through said pipe between said first end and said second end;

engaging a mole to said cable at said first end;

engaging a cable pulling device to said cable at said second end; and

installing a reaction plate at said second end after said cable is disposed through said pipe, and

pulling said mole through said pipe utilizing said cable pulling device.

41. [42.] (Once amended) A method as described in claim [41] 40 wherein said second end is exposed within an excavated hole, and wherein a reaction plate is disposed against a sidewall of said hole.

42. [43.] (Once amended) A method as described in claim 41, further including the installation of a cable pulling device engagement frame between said reaction plate and said cable pulling device after said cable is disposed through said pipe.

43. [44.] (Once amended) A method as described in claim [43] 42 wherein said frame includes a pulley for changing the direction of said cable.

44. [45.] (Once amended) A method as described in claim [42] 43 wherein said cable pulling device is disposed within said hole.

45. [46.] A method as described in claim 43 wherein said frame and said cable pulling device are disposed within said hole.

46. [47.] (Once amended) A method as described in claim [42 wherein said hole is formed of a minimal size] 40, including the further steps of:

engaging said cable with a first pair of collets on a cable pulling stroke of said cable pulling device, and

engaging said cable with a second pair of collets on a recovery stroke of said cable pulling device.

47. [48.] (Once amended) A method as described in claim [41] 40 wherein said cable pulling device is a post tensioning ram (PTR).

ATTACHMENT C
CLEAN COPY OF CLAIMS

1. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:
a mole;
a length of cable, said cable being engagable to said mole;
a cable pulling device being releasably engagable to said cable;
a cable pulling device mounting frame being releasably engagable to said cable pulling device; and wherein said cable pulling device is a post tensioning ram (PTR).

2. (Once amended) A device as described in claim 1 wherein said cable pulling device includes at least one pair of cable engaging collets that function to engage said cable on a said pulling stroke and to release said cable on a said recovery stroke; and wherein at least one further pair of collets is provided that function to engage said cable on said recovery stroke and release said cable on said pulling stroke.

6. (Once amended) A device as described in claim 2 wherein said further pair of collets is engaged within said cable pulling device.

7. (Once amended) A device as described in claim 6 wherein said cable pulling device is formed with a slotted cable insertion means for the sideways insertion of said cable within said cable pulling device.

14. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:
a mole;
a length of cable, said cable being engagable to said mole;
a cable pulling device;

a cable pulling device mounting frame being releasably engagable to said cable pulling device wherein said cable pulling device mounting frame includes an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of said cable within said cable passage bore of said annulus member.

15. (Once amended) A device as described in claim 14 wherein said annulus member includes a cable pulling device holding means for releasably holding a portion of said cable pulling device therewithin.

16. (Once amended) A device as described in claim 14 wherein said cable pulling device mounting frame includes a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device.

17. (Once amended) A device as described in claim 16 wherein said annulus member is mountable in relation to said reaction plate such that said reaction plate disburses cable pulling forces exerted on said annulus by said cable pulling device.

26. (Once amended) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said cable being engagable to said mole;

a cable pulling device including a cable engagement mechanism and a cable pulling device engagement means functioning to provide a mounting structure for said cable pulling device;

said cable pulling device engagement means further including a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated by said cable pulling device, and

a cable pulling frame, said cable pulling frame being mountable to said reaction plate and said cable pulling device being mountable to said cable pulling frame.

30. (Once amended) A mole for use in the trenchless replacement of in-situ pipe, comprising, a nose portion being engagable to a cable, a tapered body portion and a replacement pipe engagement portion, the mole further including at least one blade, said tapered body portion acting to initially contact, fracture and expand said in-situ pipe for the replacement thereof with a length of replacement pipe, and said blade acting to cut pipe engagement devices encountered by the mole after said pipe has been expanded by said tapered body portion.

33. (Once amended) A mole as described in claim 30 wherein a threaded bore is formed within the mole, and wherein a mole engagement fixture is fixedly engaged to an end of said cable, said fixture including a threaded end portion that is threadably engagable with said threaded bore.

34. (Once amended) A mole as described in claim 33 wherein said fixture further includes a hex bolt portion integrally formed therewith and provided for the tightening of said threaded portion within said threaded bore.

36. A cable pulling device engagement frame comprising:

an annulus member including a cable passage bore formed therethrough and a cable insertion slot formed through portions of said annulus member for the sideways insertion of a cable within said cable passage bore of said annulus member;

a reaction plate having an enlarged surface for disbursing a reaction force against a cable pulling force generated through said annulus member.

37. (Once amended) A frame as described in claim 36 wherein said frame includes two cable pulling device engagement devices, such that two cable pulling devices can operationally function with said frame to pull two cables simultaneously.

38. (Once amended) A frame as described in claim 37 wherein two annulus members function as said engagement devices to engage said two cable pulling devices.

39. (Once amended) A frame as described in claim 38 wherein the two annulus members are angularly disposed relative to each other, such that two cable pulling devices are operationally engaged therewith.

40. (Once amended) A method for the trenchless replacement of in-situ pipe, comprising the steps of:

exposing a first end of said pipe;

exposing a second end of said pipe;

disposing a pulling cable through said pipe between said first end and said second end;

engaging a mole to said cable at said first end;

engaging a cable pulling device to said cable at said second end; and

installing a reaction plate at said second end after said cable is disposed through said pipe, and

pulling said mole through said pipe utilizing said cable pulling device.

41. (Once amended) A method as described in claim 40 wherein said second end is exposed within an excavated hole, and wherein a reaction plate is disposed against a sidewall of said hole.

42. (Once amended) A method as described in claim 41, further including the installation of a cable pulling device engagement frame between said reaction plate and said cable pulling device after said cable is disposed through said pipe.

43. (Once amended) A method as described in claim 42 wherein said frame includes a pulley for changing the direction of said cable.

44. (Once amended) A method as described in claim 43 wherein said cable pulling device is disposed within said hole.

45. A method as described in claim 43 wherein said frame and said cable pulling device are disposed within said hole.

46. (Once amended) A method as described in claim 40, including the further steps of:

engaging said cable with a first pair of collets on a cable pulling stroke of said cable pulling device, and

engaging said cable with a second pair of collets on a recovery stroke of said cable pulling device.

47. (Once amended) A method as described in claim 40 wherein said cable pulling device is a post tensioning ram (PTR).

Please insert the following new claims:

48. (New) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said being engagable to said mole;

means for pulling said cable in a plurality of cable pulling strokes; and

means for releasably holding said cable between said cable pulling strokes.

49. (New) A device as described in claim 48, wherein said means for releasably holding said cable consists of a cable engaging device that grips said cable between said pulling strokes, and releases said cable on a pulling stroke.

50. (New) A device as described in claim 49, wherein said cable engaging device consists of a pair of collets.

51. (New) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said being engagable to said mole;

a means for pulling said cable in a series of cyclic strokes that include a pulling stroke and a recovery stroke;

a first cable engaging member that engages said cable on said pulling stroke and releases said cable on said recovery stroke; and

a second cable engaging member that engages said cable on said recovery stroke and releases said cable on said pulling stroke.

52 (New) A device as described in claim 51 wherein said first cable engaging member is formed for the sideways insertion of said cable therewithin.

53. (New) A device as described in claim 52 wherein said first cable engaging member includes a pair of cable engaging collets.

54. (New) A device as described in claim 51 wherein said second cable engaging member is formed for the sideways insertion of said cable therewithin.

55. (New) A device as described in claim 54 wherein said second cable engaging member includes a pair of cable engaging collets.

56. (New) A device as described in claim 51 wherein said means for pulling said cable includes a cable pulling device and a cable pulling device mounting frame.

57. (New) A device as described in claim 56 wherein said frame is formed for the sideways insertion of said frame upon said cable.

58. (New) A device as described in claim 57, wherein said frame includes a rotatable pulley, and wherein said cable is mounted around said pulley.

59. (New) A device as described in claim 56 wherein said cable pulling device is engaged to said frame during a cable pulling stroke.

60. (New) A device for the trenchless replacement of in-situ pipe, comprising:

a mole;

a length of cable, said being engagable to said mole;

a means for pulling said cable in a series of cyclic strokes including a pulling stroke and a recovery stroke; wherein said means for pulling said cable includes a cable pulling device and cable pulling device mounting frame;

wherein said frame includes a cable mounting means for the sideways mounting of said frame upon said cable, said mounting means including frame structural members and a pulley member engaged therewith, and said frame structural members being disposed such that said frame may be placed upon a side surface of said cable to engage said cable with said pulley.

61. (New) A device as described in claim 60 wherein said frame structural members include side members and said pulley is rotatably engaged between said side members, and wherein said side members are spaced apart to form a cable path that runs between said side members and around said pulley.

62. (New) A device as described in claim 60, further including:

a first cable engaging member that engages said cable on said pulling stroke and releases said cable on said recovery stroke; and

a second cable engaging member that engages said cable on said recovery stroke and releases said cable on said pulling stroke.

63. (New) A device as described in claim 62 wherein said first cable engaging member is formed for the sideways insertion of said cable within said cable engaging member.

64. (New) A device as described in claim 63 wherein said first cable engaging member consists of a pair of cable engaging collets.

65. (New) A device as described in claim 62 wherein said second cable engaging member is formed for the sideways insertion of said cable within said second cable engaging member.

66. (New) A device as described in claim 65 wherein said second cable engaging member consists of a pair of cable engaging collets.

67. (New) A device as described in claim 60 wherein said cable pulling device is engaged to said frame during a cable pulling stroke.

68. (New) A method for the trenchless replacement of in-situ pipe having a first end and a second end, comprising the steps of:

disposing a cable through said pipe between said first end and said second end;

engaging a mole to said cable at said first end;

engaging a cable pulling means to said cable at said second end;

pulling said mole through said pipe utilizing said cable pulling means in a series of cyclic strokes including a pulling stroke and a recovery stroke; and

engaging said cable with a first cable engagement device on a cable pulling stroke, and engaging said cable with a second cable engagement device on a recovery stroke.

69. (New) A method as described in claim 68 further including the steps of:

pulling said cable utilizing a movable first cable engagement device during a cable pulling stroke; and

holding said cable in a stationary second cable engagement device during a said recovery stroke.

70. (New) A method as described in claim 68 wherein said cable pulling means includes a cable pulling device and a frame having said cable pulling device mounted thereto.

71. (New) A method as described in claim 70 wherein said step of engaging a cable pulling means to said cable includes the further step of placing said frame upon a side surface of said cable after said cable has been disposed through said pipe.

72. (New) A method as described in claim 71 wherein said frame includes side members and a pulley is engaged between said side members, and said side members are spaced apart to form a cable path that runs between said side members and around said pulley, such that said cable is engaged with said pulley when said frame is mounted upon said cable.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No.: 16279-14C1

Applicant: Carter et al.
Examiner: Unassigned
Group No.: Unassigned
Serial No.: Unassigned
Filing Date:
Title: **"DEVICE AND METHOD FOR TRENCHLESS REPLACEMENT OF UNDERGROUND PIPE"**

LETTER TO THE OFFICIAL DRAFTSMAN

ATTN: Official Draftsman
Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please replace the attached Figs. 9, 19, 22, 24, 27 and 29 for the like numbered figures originally filed with the application.

Date: August 24, 2001

Respectfully submitted,

By _____
ROBERT O. GUILLOT
Reg. No. 28,852

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(650) 320-4000

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Date: August 24, 2001

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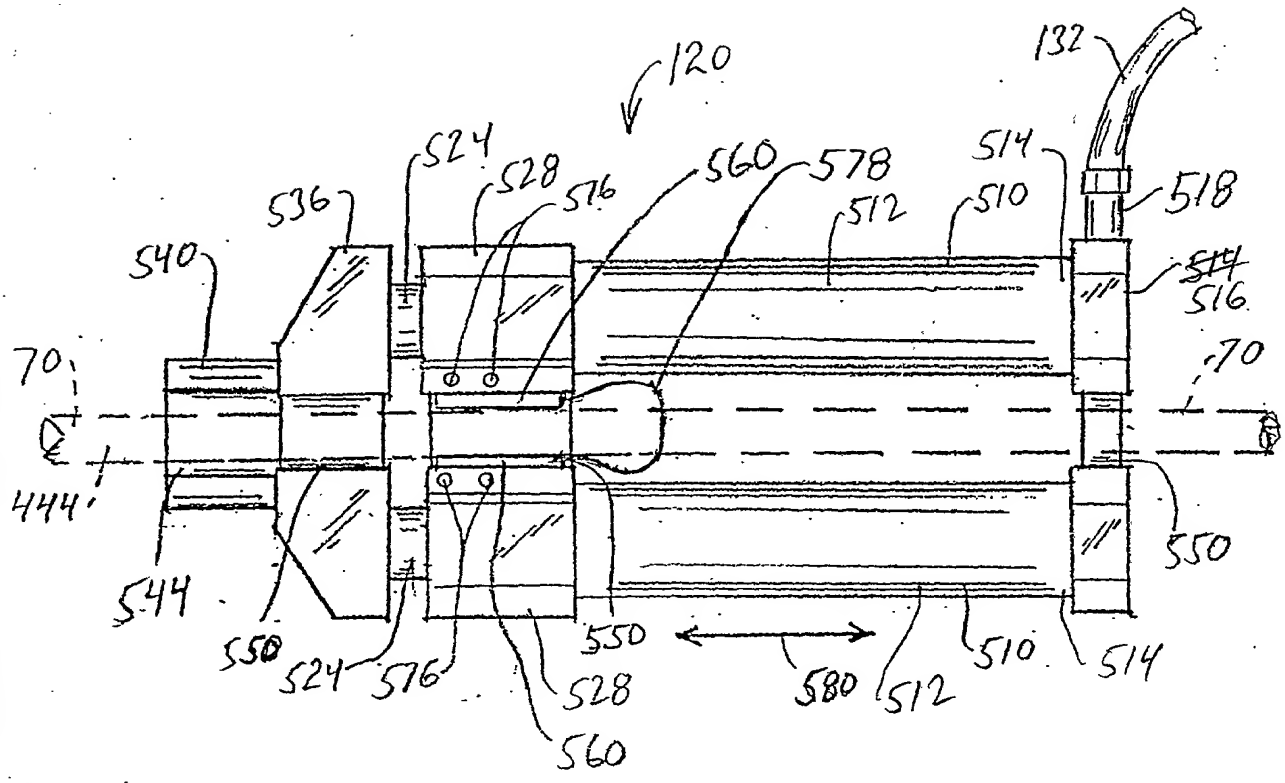
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FIG. 9

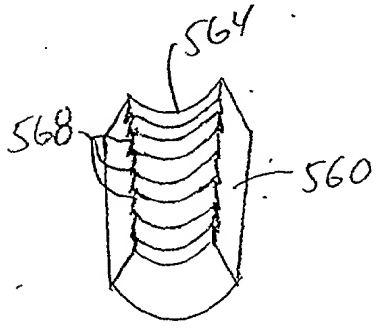
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FIG. 10

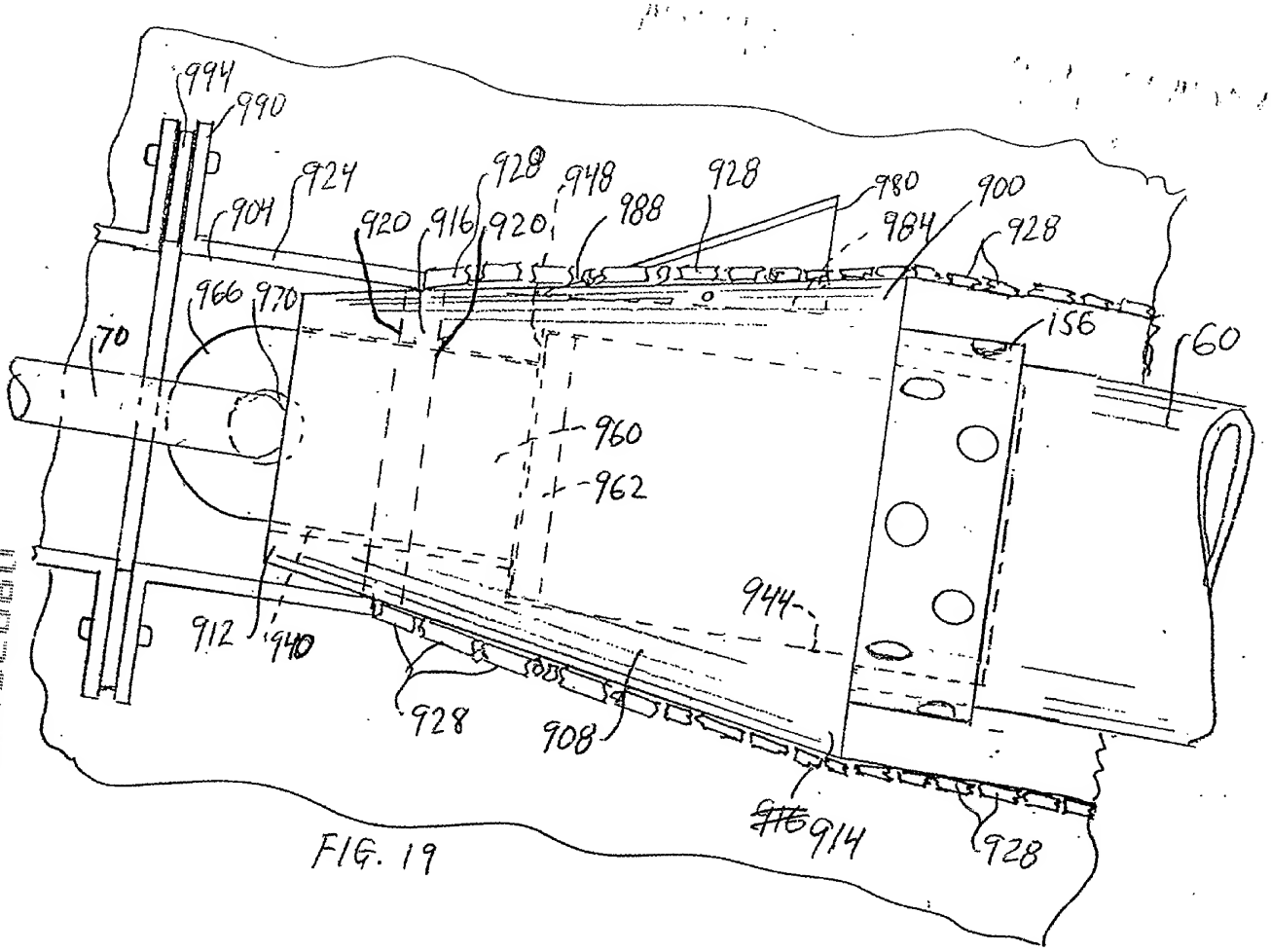
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FIG. 19

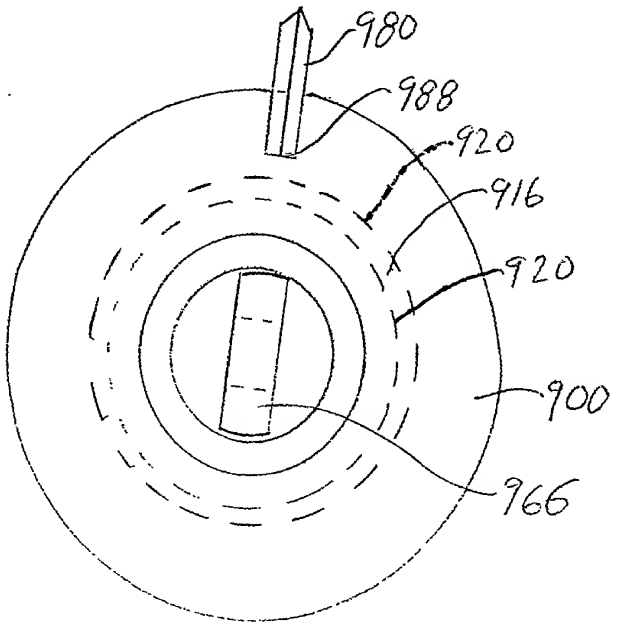
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FIG. 20

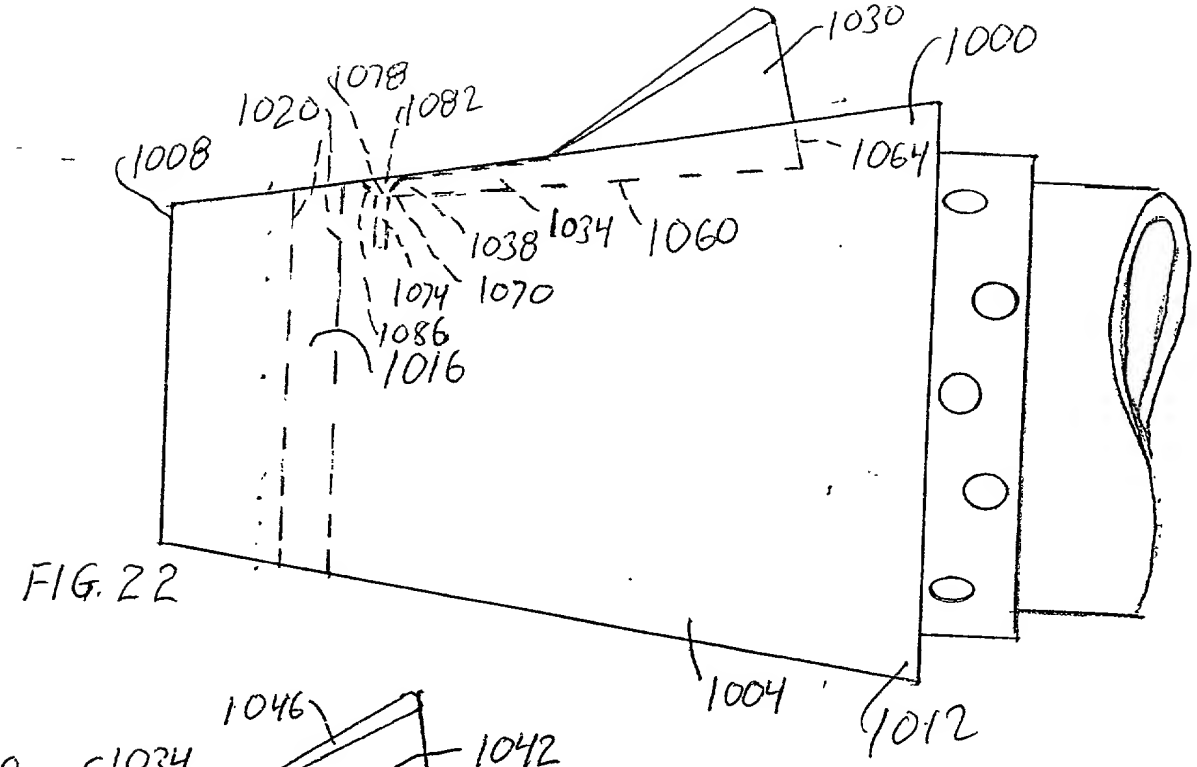

FIG. 22

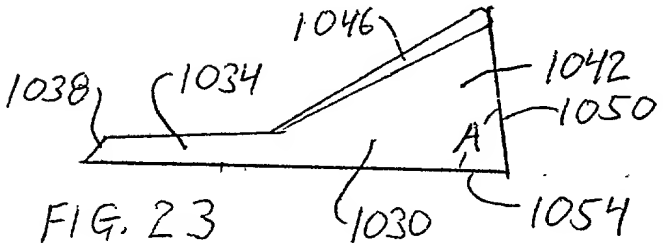

FIG. 23

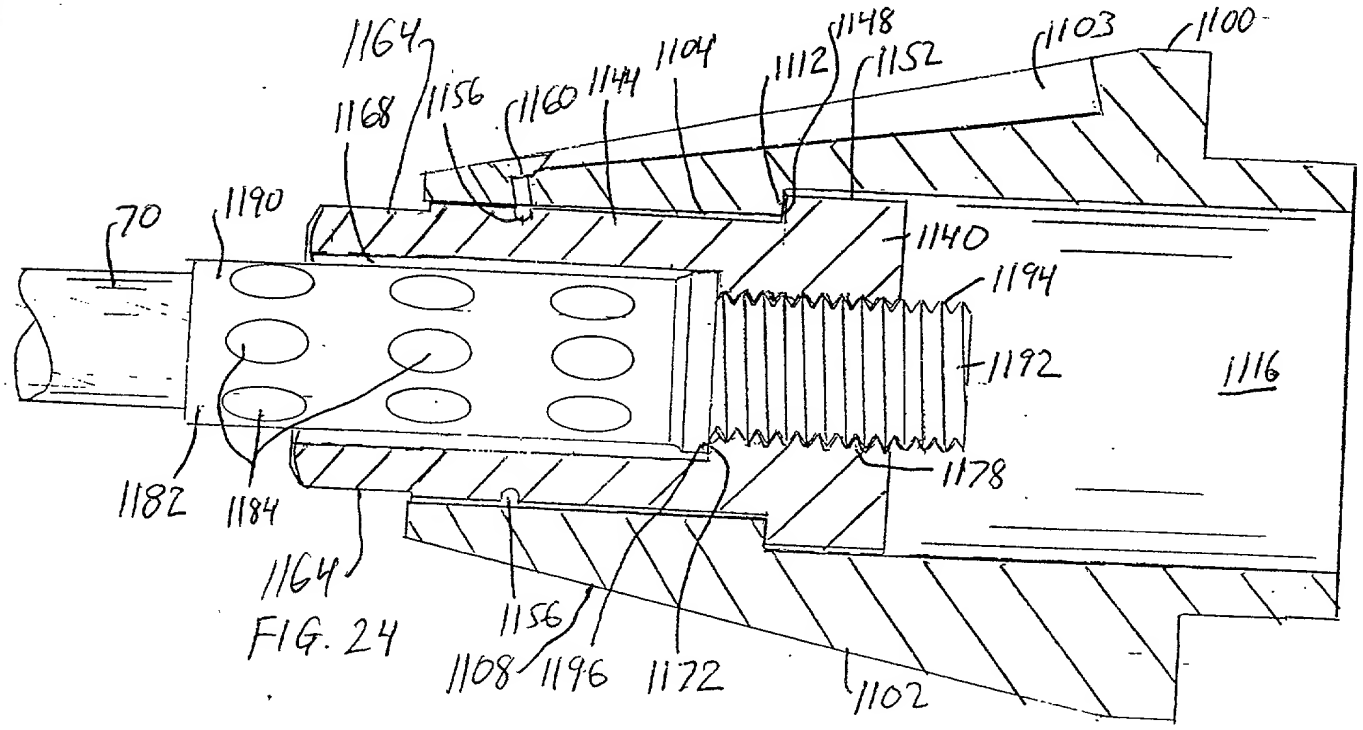

FIG. 24

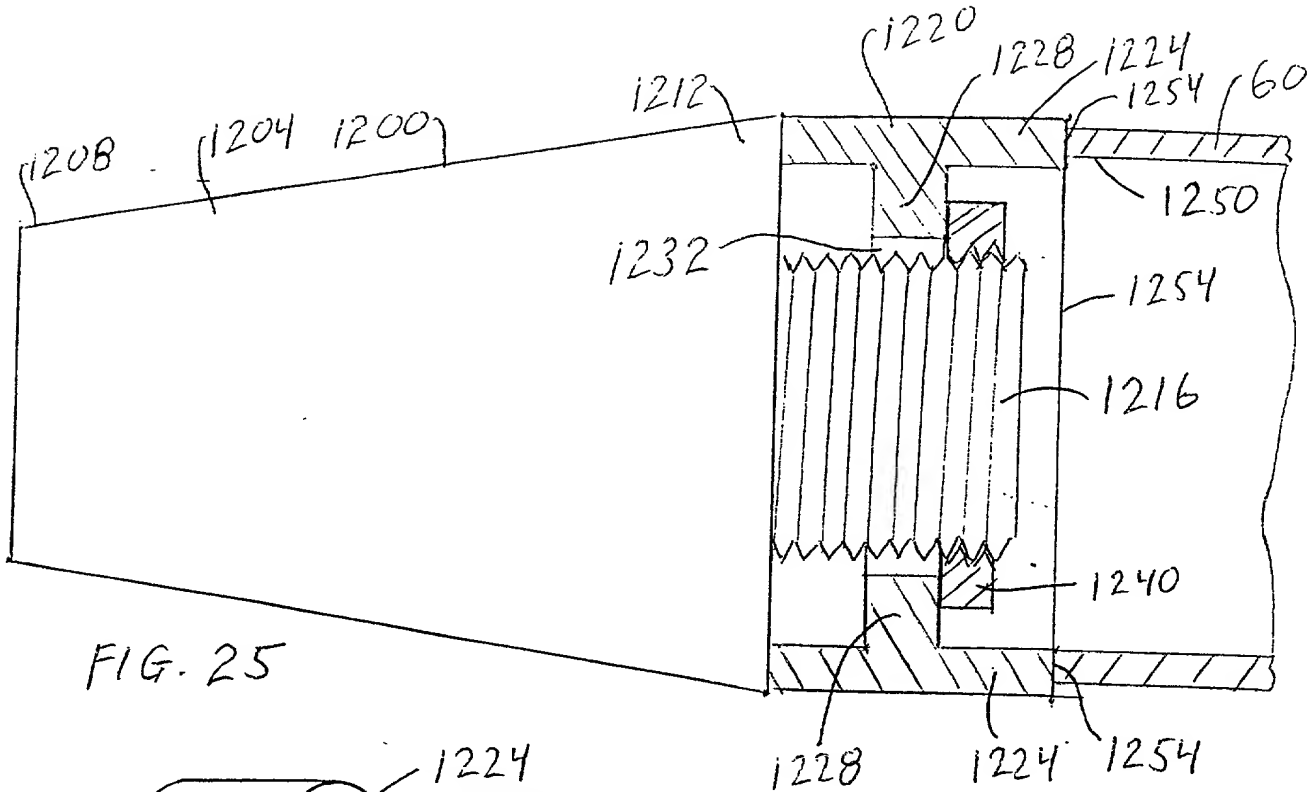

FIG. 25

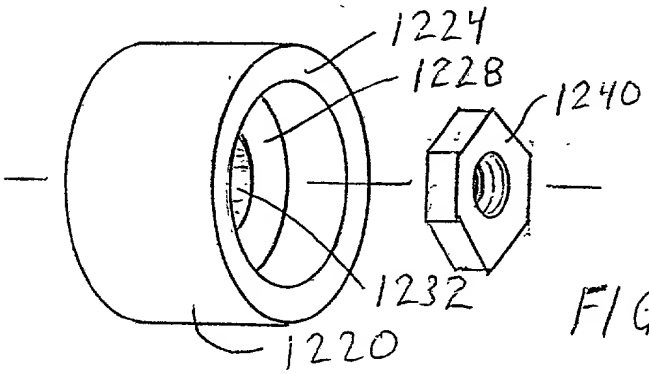

FIG. 26

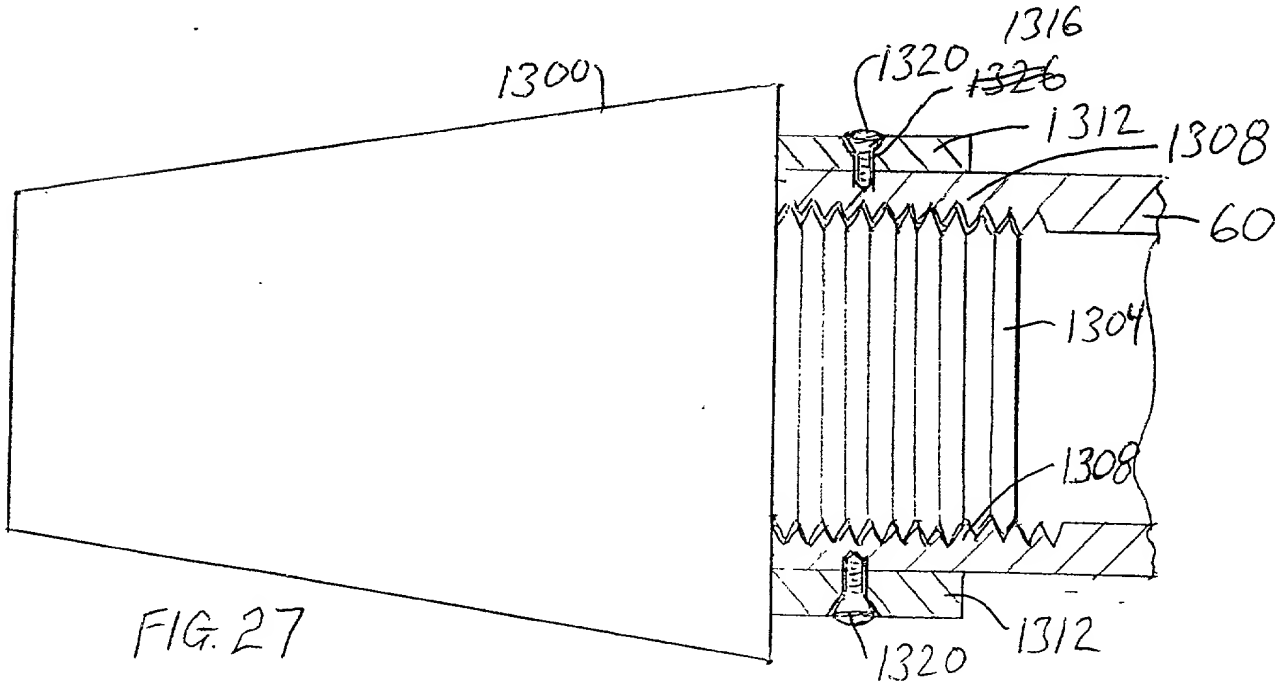

FIG. 27

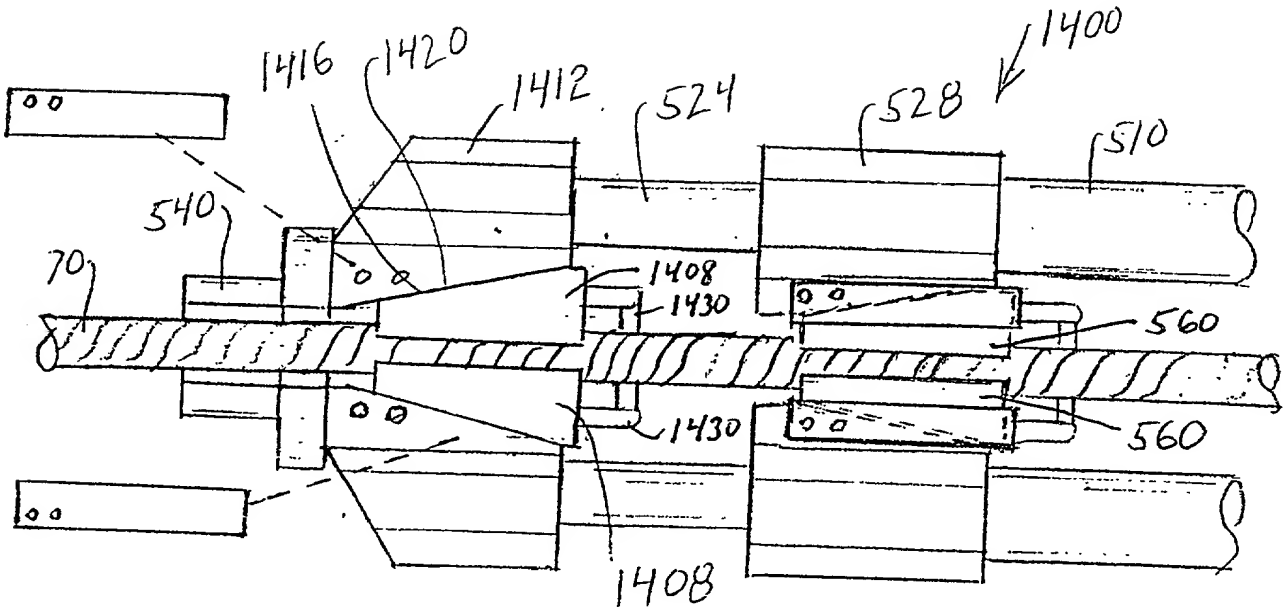
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FIG.28

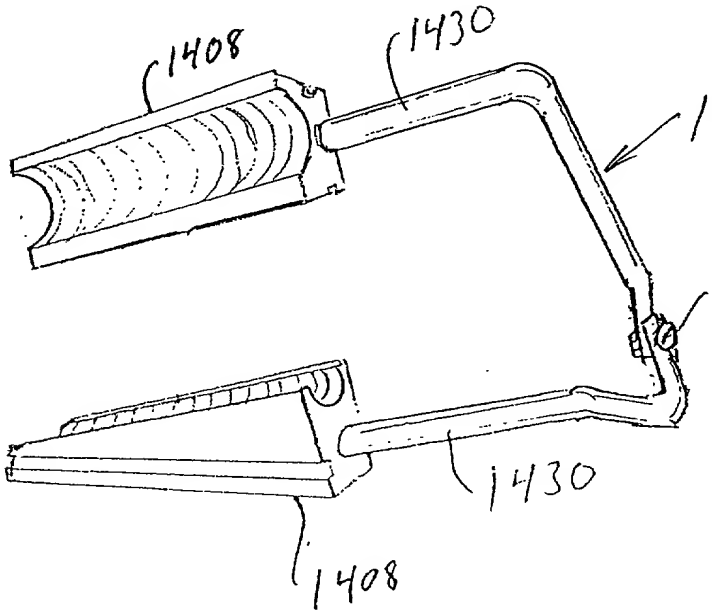
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FIG. 29